



Local Support you can rely on

We trust you are all managing well, with staff, family and clients all keeping safe, supported and in good health as we all navigate the fluctuating environment we are currently faced with.

While we all have to modify how we conduct our business, at Winstone Wallboards we are working hard to provide you with the service and support you are accustomed to.

PREFAB - OUR TRIED AND TESTED SOLUTIONS

CASE STUDY

by Richard Hunt
Senior Technical
Engineer



Panellised construction, an element of prefabrication, has become a method by which we can deliver more buildings in New Zealand while not being affected by weather, adverse conditions or the lack of daylight hours. Building in a controlled environment such as a factory enables faster delivery of a semi-finished product to site come rain, hail or shine – enabling quicker installation and faster overall project completion.

Winstone Wallboards has been working closely with fabricators, drawing on the extensive experience of our engineering team, to provide technical support and specific design input; aligning or modifying our systems to allow rapid manufacture and efficient installation.

As build typologies are different for each fabricator, systems can be tested to the way the elements will be manufactured in

order to show compliance to the building code. Everything is tested, verified and technically precise.

Thus far, we have worked with manufacturers to verify systems for bracing, fire and acoustics in the mass-production process that they are using, tailoring the solution to what the customer wants to achieve.

Specifically developed solutions – stapling systems

Staple fixing systems are often a prevalent part of the required scope to facilitate efficient manufacturing on an assembly line; a recent collaboration between Winstone Wallboards engineers, and the manufacturers development team has resulted in:

- Assessment of alternative panel hold down options for bracing.
- Development of a staple installation option for GIB Weatherline® Rigid Air Barrier and other GIB® Plasterboard Bracing and Fire Systems.
- Testing of the stapled installation option in the ALTUS wind pressure booth.
- Testing of the stapled installation on the P21 rig for bracing resistance.
- Development of specification data sheets to support consent applications.



If you would like to explore how our technical engineers can assist with tailoring and testing solutions to meet your needs, please call the GIB® Technical Helpline

0800 100 442; engaging our engineering and technical resources.

It's all part of the service.

COMPOUND ADHESION MECHANISM TO PLASTERBOARD

CASE STUDY

by Anuradha Abhyankar
Senior Chemist



People in New Zealand mostly prefer monolithic walls - nice and smooth, finished with paint.

To achieve this smoothness, joint compound is applied on the joints, reinforcing them with tape. The choice of joint compounds that can be used are from either a setting type (plaster-based powder formulation) or air-drying type (limestone-based ready mixed paste from a pail/box). Ideally these joint compounds are applied in three coats.

01. Base coat or the taping coat in which the tape is incorporated.
02. Second coat to fill any hollows left by the earlier coat.
03. Topcoat to smooth out the joint and get an even finish.

Normally the first two coats used are from the setting type of compounds and the topcoat used is from the air-drying type of compounds. Sometimes some stoppers use air drying (ready mixed) compounds for all the three coats.

Here the opportunity is taken to describe the mechanism of how these two compound types (setting and air-drying) help adhere to the plasterboard and create that strong bond (base coat adhesion). Also detailed are the points we need to be aware of and consider when deciding choice of compound to be used.

Setting compounds

These are plaster based powdered compounds and are mixed on site with

water before use. They come in pre-determined working times as indicated on the bags. For example, a 90 minute product is going to set in about 90+ minutes from the time the powder is added to water. So essentially, all mixed compound needs to be used up in 90 min. Mechanical tools if used need to be cleaned before the compound sets in them.

This plaster mixture is applied on the plasterboard and the tape reinforced in the joint. When this compound is spread on the plasterboard the compound starts losing moisture back into the board and some of the moisture will evaporate into the atmosphere depending on the environmental conditions. Simultaneously the plaster is converting to gypsum. This conversion (chemical reaction) exhibits itself as an exothermic reaction. Heat is generated as the gypsum crystals form and grow. The gypsum crystals grow within themselves and into the plasterboard paper surface. This growth creates the anchor points for the compound to adhere to the plasterboard. When this compound dries the gypsum gets its full strength realisation and presents itself as a strong joint.

Care needs to be taken to make sure that adequate compound is under the tape and the compound sets before it dries, especially in hot dry environments. Small amount of polymer binder is added to cater for the adhesion of the feathered edges to the plasterboard. Setting compounds dry relatively quicker and shrink less. The bulk of the shrinkage takes place within the setting time. The strength of the setting compound exhibits itself in the form of a product being hard to sand and therefore not recommended as a topcoat.

Air drying compounds

There are no time restrictions on use of air-drying compounds compared to the setting type compounds especially when used in machine tools. Most air-drying compounds can be used as a base coat. These compounds bring

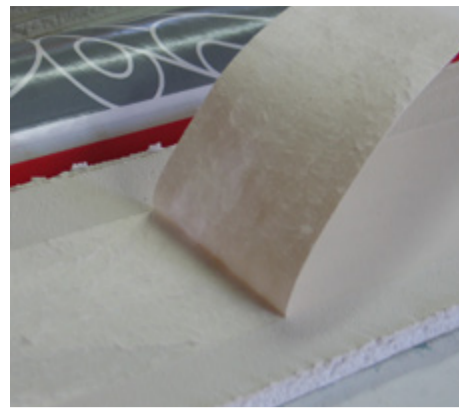


FIGURE 1: Setting compound strong joint adhesion through gypsum crystal formation.



FIGURE 3: Air-drying compound strong mechanical adhesion on plasterboard.

about the adhesion to the plasterboard by compacting itself (manifested as shrinkage) and embedding into the coarse paper surface. The shrinkage helps pull the compound closer to the plasterboard surface making it denser and generating the adhesion. More polymer binder quantities are present in these formulations as compared to the setting compounds and thus exhibit good adhesion on the plasterboard when dry.

In using these compounds as base coat care needs to be taken to have enough compound under the tape to get good adhesion. These air-drying compounds shrink more than the setting type of compounds. Air-drying compounds take more time to dry and rely more on the environmental conditions (temperature and humidity) to come to its stable state. Until the time the compound is completely dry, shrinkage continues to occur. Drying can take much longer in winter and has potential to result in delayed shrinkage issues if not taken

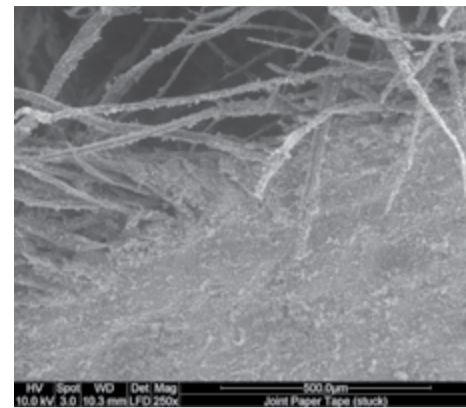


FIGURE 2: Gypsum integration with the paper fibres.

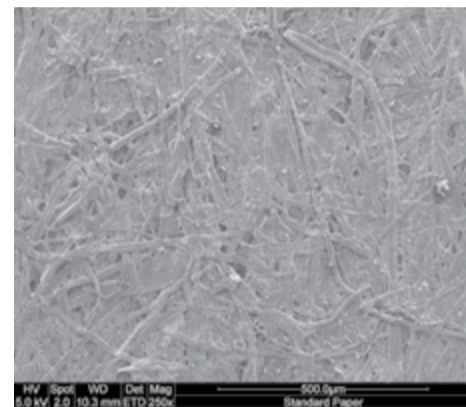


FIGURE 4: Paper surface enlarged to show keying sites.

care of while stopping. Once dry these compounds are comparatively easy to sand and create a smooth surface much more easily.

Main points we can take away can be summarised as:

- Environmental conditions need to be kept in mind before making a compound choice. Use of appropriate heating and good ventilation to be ensured.
- Setting compounds are preferred to be used as base coats especially in winter.
- Air-drying compounds can be used as a base coat where there are very good drying conditions as in summer or provided it is completely dry before the second coat is applied.

For further information go to gib.co.nz or call the GIB® Helpline on 0800 100 442.

